

ABSTRACT OF THE DISCLOSURE

GaAs_(1-x)Sb_x layers are grown by MOCVD. For lattice matching with InP, x is set to 0.5, while beneficial alternatives include setting x to 0.23, 0.3, and 0.4. During MOVCD, TMGa (or TEGa), TMSb, and AsH₃ (or TBAs) are used to fabricate the GaAs_(1-x)Sb_x layer. Beneficially, the GaAs_(1-x)Sb_x layer's composition is controlled by the ratio of As to Sb. The MOCVD growth temperature is between 500 °C and 650 °C. The GaAs_(1-x)Sb_x layer is beneficially doped using CCl₄ or CBr₄. A heavily doped GaAs_(1-x)Sb_x layer can be used to form a tunnel junction with n-doped layers of InP, AlInAs, or with lower bandgap materials such as AlInGaAs or InGaAsP. Such tunnel junctions are useful for producing long wavelength VCSELs.